

SPEECH  
SYNTHESIS SYSTEM 100

110  
TARGET WORD SEQUENCE

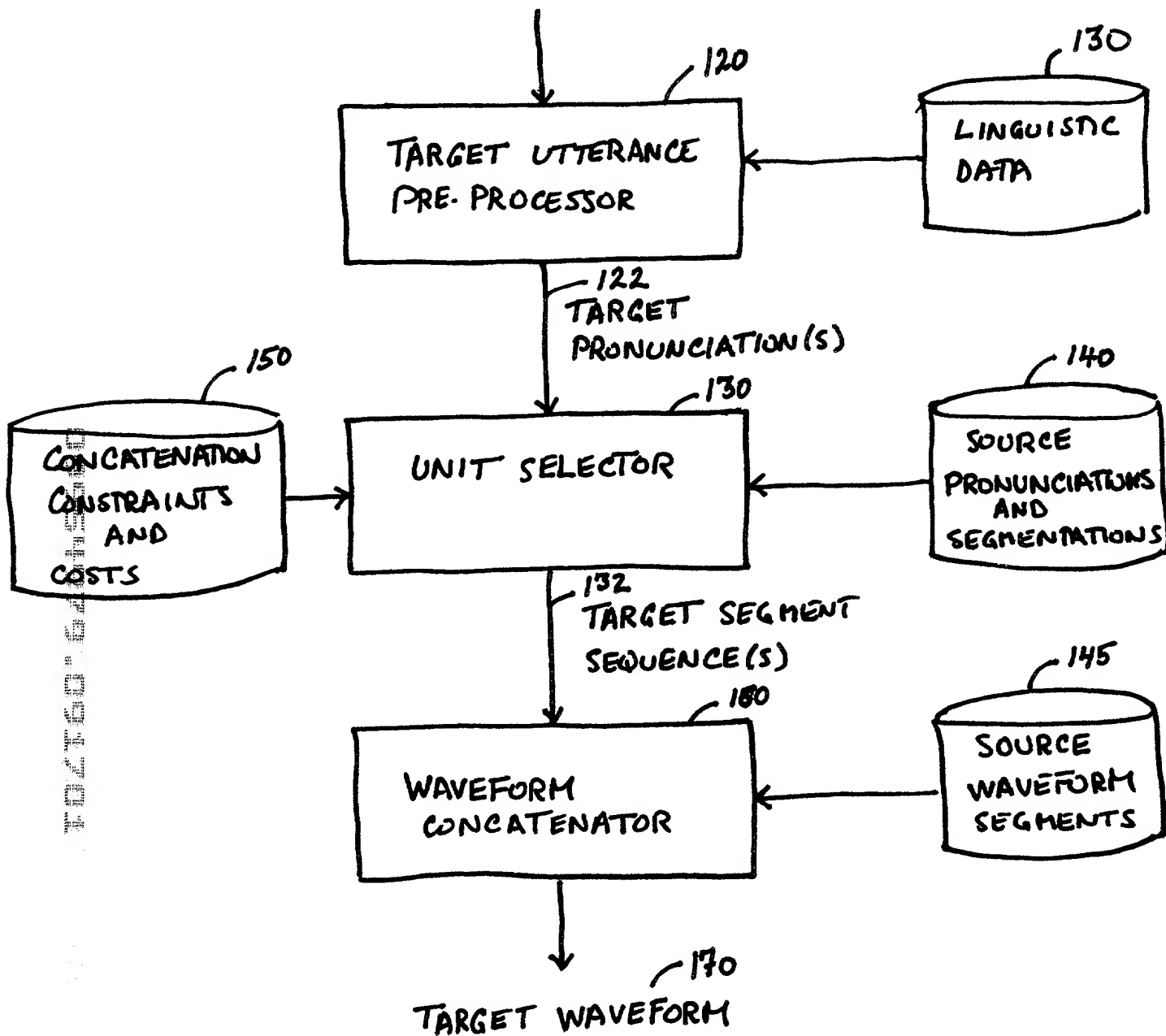


FIG. 1

# TARGET UTTERANCE PRE-PROCESSING:

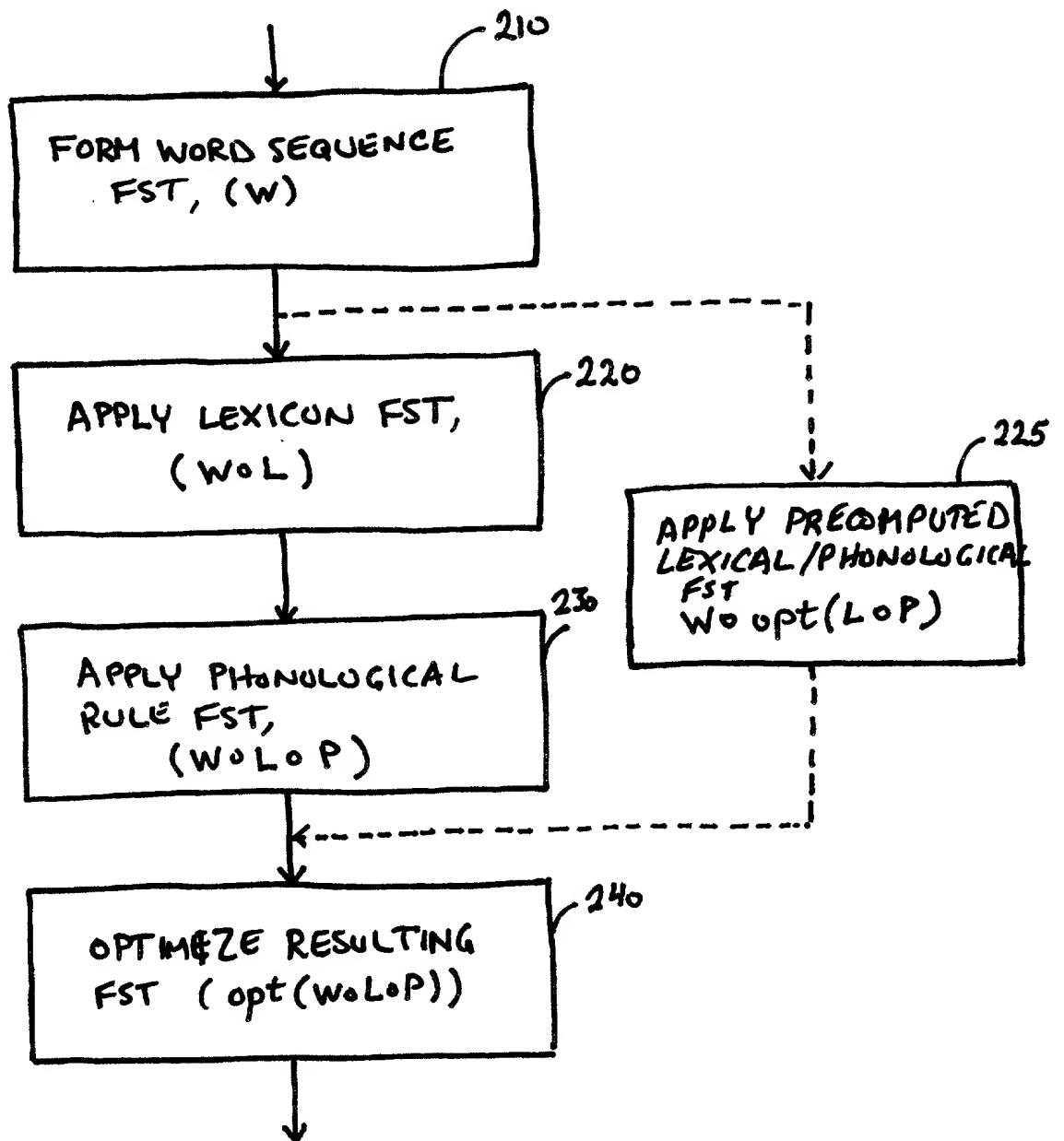


FIG. 2

# UNIT SELECTION:

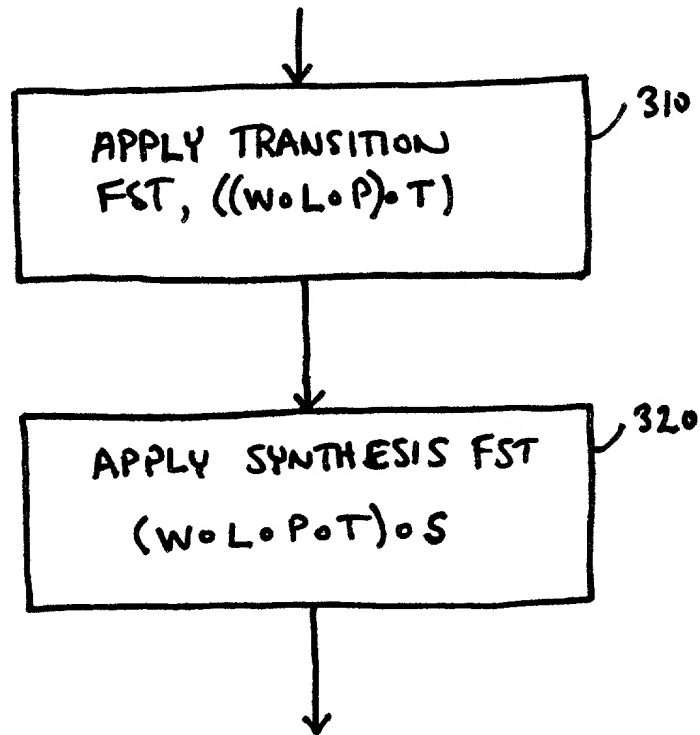


FIG. 3

## FORMING SYNTHESIS FST (S)

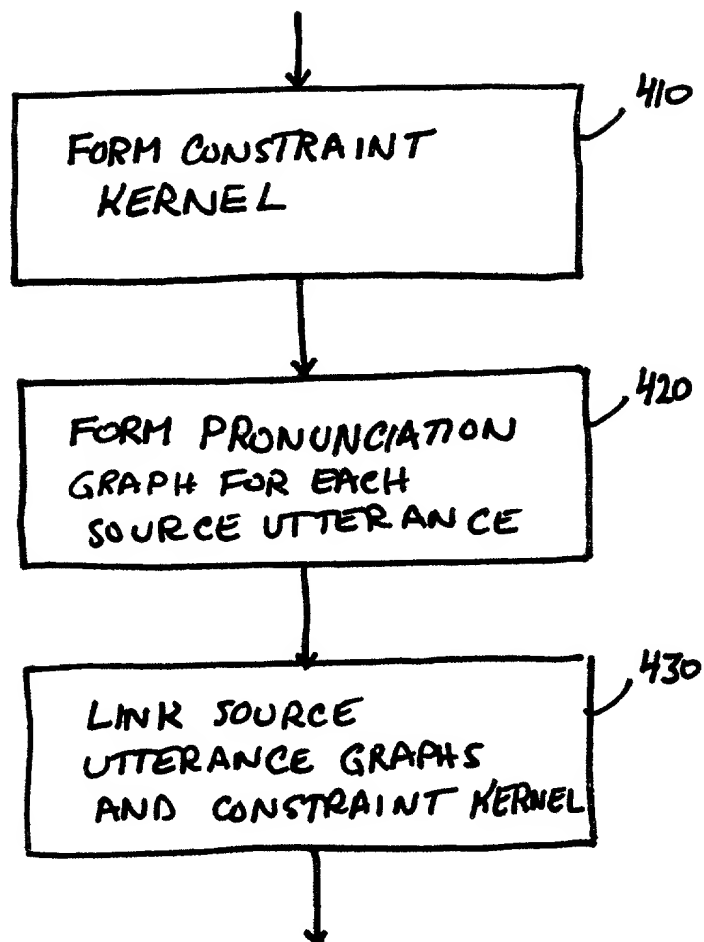


FIG. 4

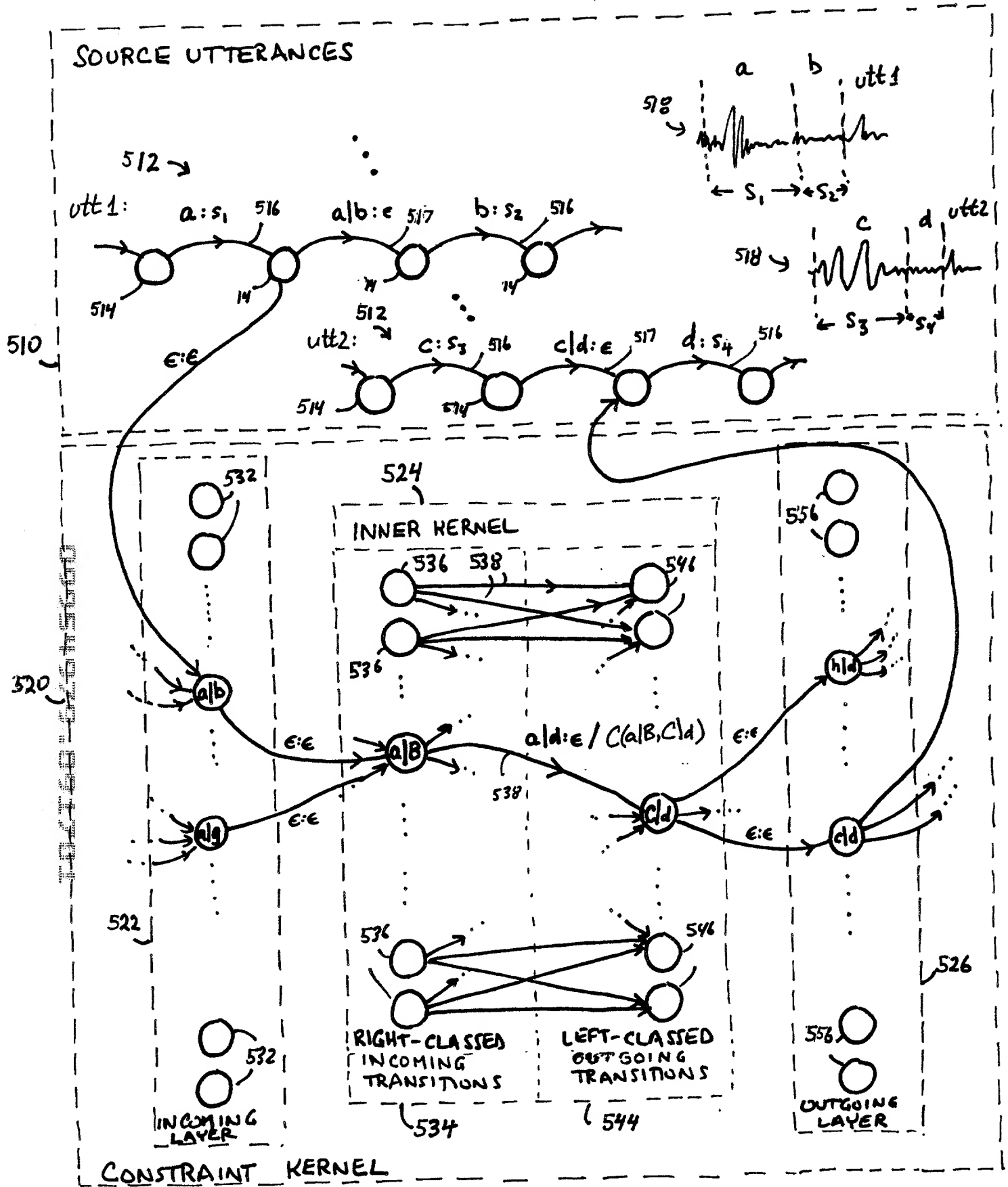


FIG. 5

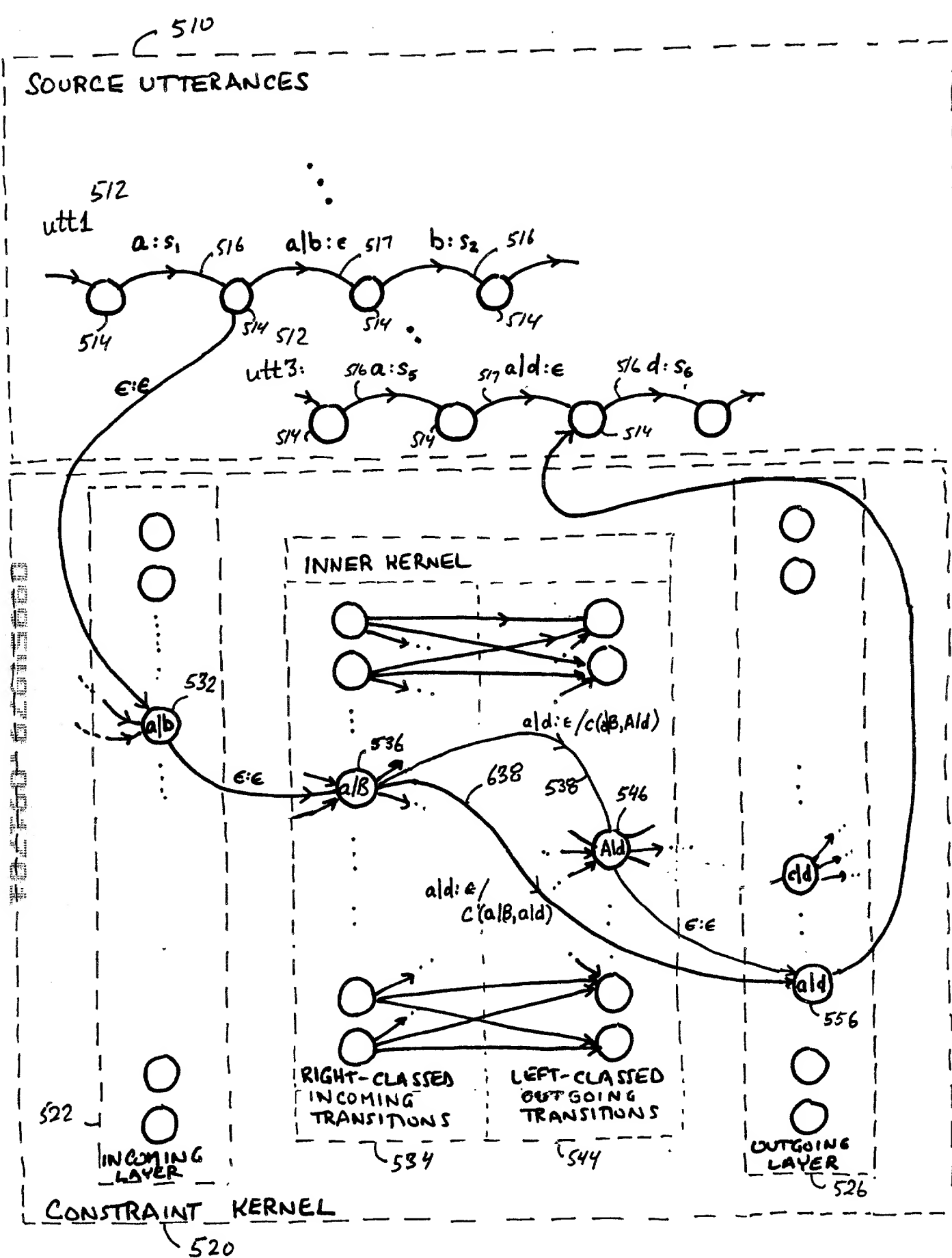


FIG. 6

# SOURCE UTTERANCES

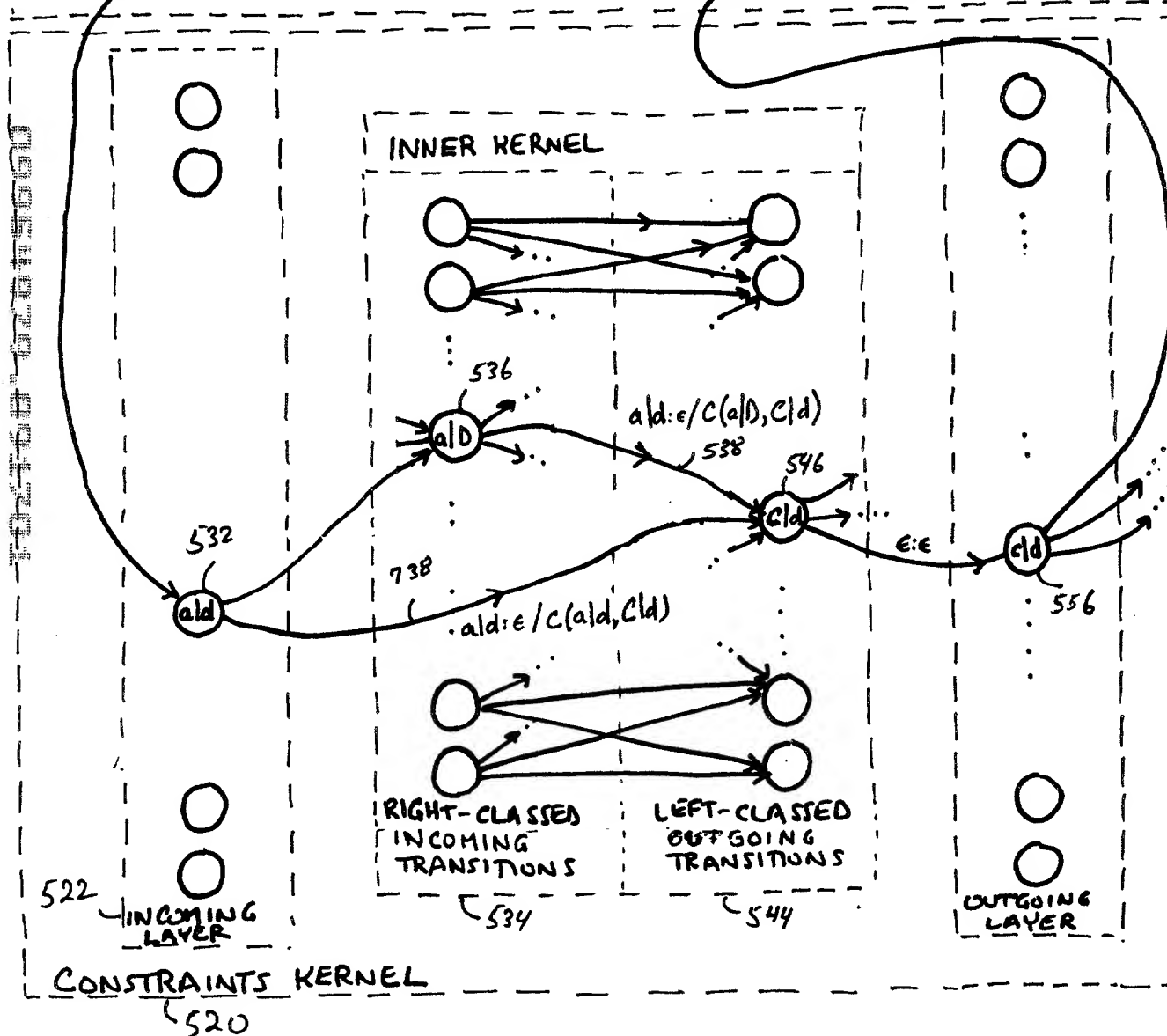
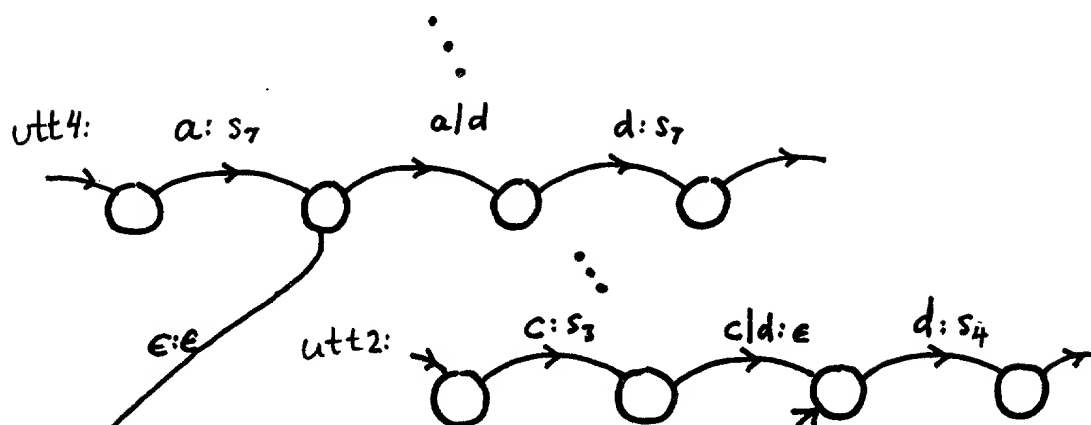
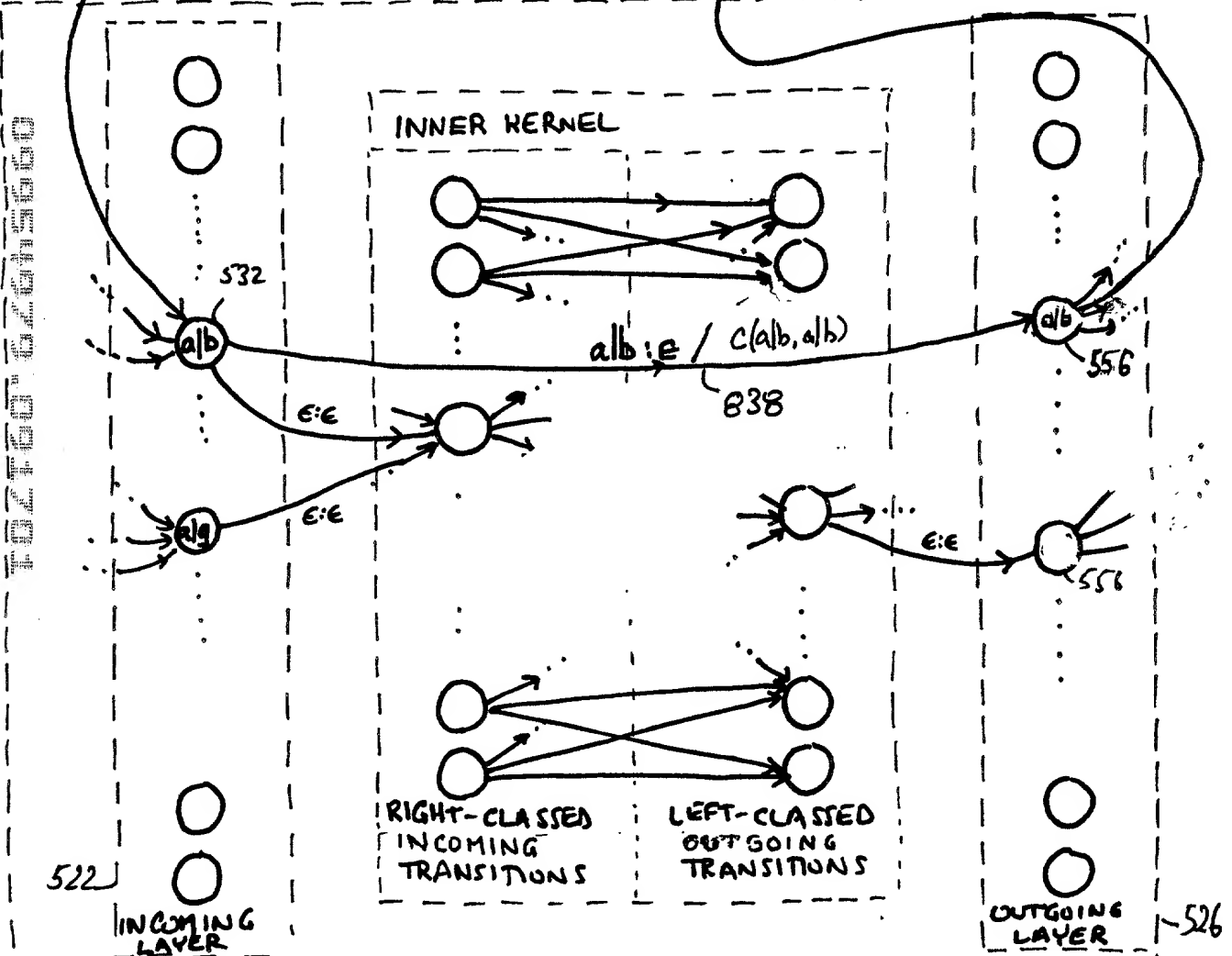
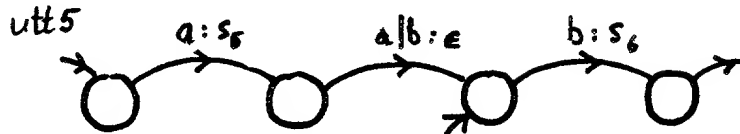
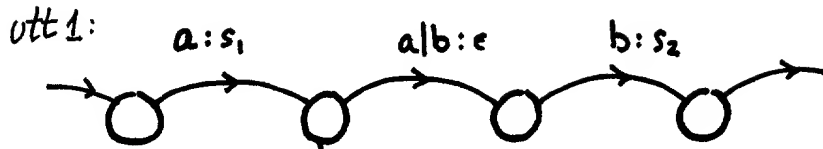
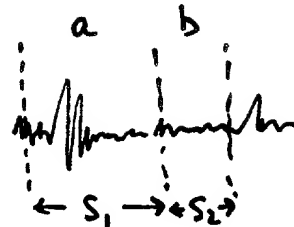


FIG. 7

# SOURCE UTTERANCES



## CONSTRAINTS KERNEL

520

FIG. 8



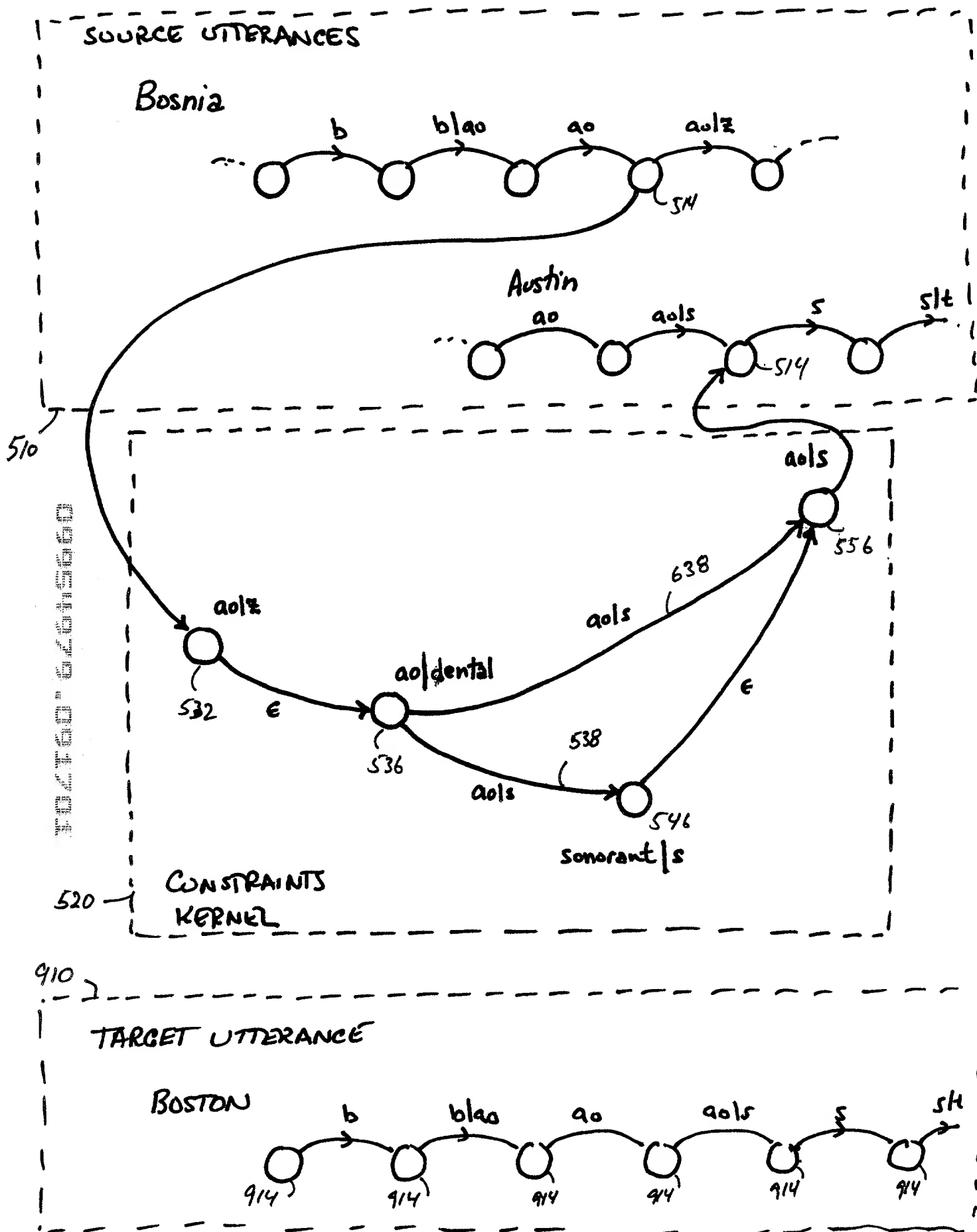


FIG. 9

vowel: y iy ih ix ux ey eh ae ay oy uw uh ah ax ow er aa ao aw  
 semivowel: w l r el ,  
 nasal: m em n en ng  
 aspirant: hh  
 obstruent: b bcl p pcl f v d dcl t tcl s z sh zh ch jh th dh dx g gcl k kcl  
 silence: h# pau

FIG. 10A

|           | vowel | semivowel | nasal | obstruent | aspirant | silence |
|-----------|-------|-----------|-------|-----------|----------|---------|
| vowel     | 10000 | 10000     | 7500  | 10        | 10       | 10      |
| semivowel | 1000  | 7500      | 7500  | 10        | 10       | 10      |
| nasal     | 5000  | 10        | 10    | 10        | 10       | 10      |
| obstruent | 10    | 10        | 10    | 10000     | 10       | 10      |
| aspirant  | 5000  | 5000      | 10    | 5000      | 10       | 10      |
| silence   | 10    | 10        | 10    | 10        | 10       | 10      |

FIG. 10B

|            |  |
|------------|--|
| vowel:     | y iy ih ix ux ey eh ae ay oy uw uh ah ax ow er aa ao aw w l r el |
| fricative: | f v s z th dh dx sh zh ch jh hh                                  |
| stop:      | b bcl d dcl g p pcl t tcl k kcl                                  |
| nasal:     | m em n en ng   |
| silence:   | h# pau   |

FIG. 11

|               |                                      |
|---------------|--------------------------------------|
| labial:       | b bcl p pcl f v w                    |
| dental:       | d dcl t tcl s z sh zh ch jh th dh dx |
| velar:        | g gcl k kcl                          |
| nasal_labial: | m em                                 |
| nasal_dental: | n en                                 |
| nasal_velar:  | ng                                   |
| front:        | y iy ih ix ux ey eh ae ay oy         |
| back:         | uw uh ah ax ow er aa ao aw l r el    |
| none:         | hh h# pau                            |

FIG. 12A

|          | labial | alveolar | velar | m    | n    | ng   | front | back | none |
|----------|--------|----------|-------|------|------|------|-------|------|------|
| labial   | 10     | 1000     | 1000  | 1000 | 1000 | 1000 | 1000  | 1000 | 1000 |
| alveolar | 1000   | 10       | 1000  | 1000 | 1000 | 1000 | 1000  | 1000 | 1000 |
| velar    | 1000   | 1000     | 10    | 1000 | 1000 | 1000 | 1000  | 1000 | 1000 |
| m        | 100    | 1000     | 1000  | 10   | 1000 | 1000 | 1000  | 1000 | 1000 |
| n        | 1000   | 100      | 1000  | 1000 | 10   | 1000 | 1000  | 1000 | 1000 |
| ng       | 1000   | 1000     | 100   | 1000 | 1000 | 10   | 1000  | 1000 | 1000 |
| front    | 1000   | 1000     | 1000  | 1000 | 1000 | 1000 | 10    | 1000 | 1000 |
| back     | 1000   | 1000     | 1000  | 1000 | 1000 | 1000 | 1000  | 10   | 1000 |
| none     | 1000   | 1000     | 1000  | 1000 | 1000 | 1000 | 1000  | 1000 | 10   |

FIG. 12B

|          | labial | alveolar | velar | m    | n    | ng   | front | back | none |
|----------|--------|----------|-------|------|------|------|-------|------|------|
| labial   | 10     | 1000     | 1000  | 1000 | 1000 | 1000 | 1000  | 1000 | 1000 |
| alveolar | 1000   | 10       | 1000  | 1000 | 1000 | 1000 | 1000  | 1000 | 1000 |
| velar    | 1000   | 1000     | 10    | 1000 | 1000 | 1000 | 1000  | 1000 | 1000 |
| m        | 100    | 1000     | 1000  | 10   | 1000 | 1000 | 1000  | 1000 | 1000 |
| n        | 1000   | 100      | 1000  | 1000 | 10   | 1000 | 1000  | 1000 | 1000 |
| ng       | 1000   | 1000     | 100   | 1000 | 1000 | 10   | 1000  | 1000 | 1000 |
| front    | 1000   | 1000     | 1000  | 1000 | 1000 | 1000 | 10    | 1000 | 1000 |
| back     | 1000   | 1000     | 1000  | 1000 | 1000 | 1000 | 1000  | 10   | 1000 |
| none     | 1000   | 1000     | 1000  | 1000 | 1000 | 1000 | 1000  | 1000 | 10   |

FIG. 12C

|            |  |
|------------|--|
| retroflex: | r er   |
| round:     | uw ux w ow aw  |
| sonorant:  | y iy ih ix ey eh ae ay oy uh ah ax aa ao l el m em n en ng                 |
| other:     | b bcl p pcl f v d dcl t tcl s z sh zh ch jh th dh dx g gcl k kcl hh h# pau |

FIG. 13A

|            |   |
|------------|---|
| retroflex: | r er  |
| round:     | uw ux w b bcl p pcl f v m em                                |
| sonorant:  | y iy ih ix ey eh ae ay oy aw uh ah ax ow aa ao l el n en ng |
| other:     | d dcl t tcl s z sh zh ch jh th dh dx g gcl k kcl hh h# pau  |

FIG. 13B

|           |     |     |     |     |
|-----------|-----|-----|-----|-----|
| retroflex | 10  | 100 | 100 | 100 |
| round     | 100 | 10  | 100 | 100 |
| sonorant  | 100 | 100 | 10  | 100 |
| other     | 100 | 100 | 100 | 10  |

FIG. 13C

|           |     |     |     |     |
|-----------|-----|-----|-----|-----|
| retroflex | 10  | 100 | 100 | 100 |
| round     | 100 | 10  | 100 | 100 |
| sonorant  | 100 | 100 | 10  | 100 |
| other     | 100 | 100 | 100 | 10  |

FIG. 13D

front: y iy ih ix ey eh ae ay oy  
back: uh ah ax aa ao l el  
retroflex: r er  
round: uw ux w ow aw  
other: b bcl p pcl f v d dcl t tcl s z sh zh ch jh th dh dx g gcl k kcl m em n en ng hh h# pau

FIG. 14A

front: y iy ih ix ey eh ae aw  
back: uh ah ow aa ao ay oy l el  
retroflex: r er  
round: uw ux w  
schwa: ax  
other: b bcl p pcl f v d dcl t tcl s z sh zh ch jh th dh dx g gcl k kcl m em n en ng hh h# pau

FIG. 14B

|           | front | back | retroflex | round | other |
|-----------|-------|------|-----------|-------|-------|
| front     | 10    | 10   | 10        | 10    | 10    |
| back      | 10    | 10   | 10        | 10    | 10    |
| retroflex | 10    | 10   | 10        | 10    | 10    |
| round     | 10    | 10   | 10        | 10    | 10    |
| other     | 500   | 500  | 500       | 500   | 10    |

FIG. 14C

|           | front | back | retroflex | round | schwa | other |
|-----------|-------|------|-----------|-------|-------|-------|
| front     | 10    | 100  | 100       | 100   | 500   | 100   |
| back      | 100   | 10   | 100       | 100   | 500   | 100   |
| retroflex | 100   | 100  | 10        | 100   | 500   | 100   |
| round     | 100   | 100  | 100       | 10    | 500   | 100   |
| schwa     | 500   | 500  | 500       | 500   | 10    | 500   |
| other     | 100   | 100  | 100       | 100   | 500   | 10    |

FIG. 14D

obstruent: b bcl p pcl f v d dcl t tcl s z sh zh ch jh th dh dx g gcl k kcl hh h# pau  
 sonorant: y iy ih ix ux ey eh ae aw uw uh ah ax ow er aa ao ay oy w l r el m em n en ng

FIG. 13A

voiced: b bcl v d dcl z zh jh dh g gcl dx h# pau  
 unvoiced: p pcl f t tcl s sh ch th k kcl hh  
 sonorant: y iy ih ix ux ey eh ae aw uw uh ah ax ow er aa ao ay oy w l r el m em n en ng

FIG. 13B

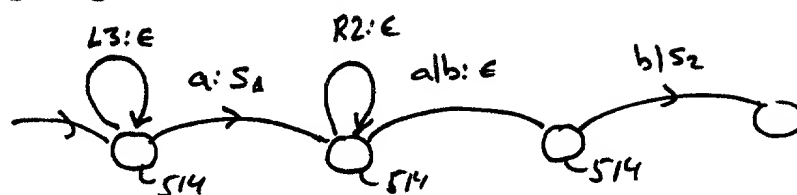
|           | obstruent | sonorant |
|-----------|-----------|----------|
| obstruent | 10        | 1000     |
| sonorant  | 1000      | 10       |

FIG. 13C

|          | voiced | unvoiced | sonorant |
|----------|--------|----------|----------|
| voiced   | 10     | 100      | 1000     |
| unvoiced | 100    | 10       | 1000     |
| sonorant | 1000   | 1000     | 10       |

FIG. 13D

Source utterance 512



target utterance 912

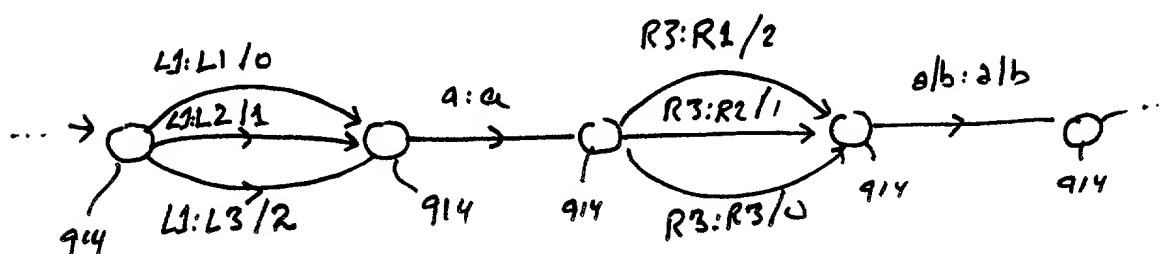


FIG. 16